ACOM.M/B 2.2

BASIC System

DICOM Conformance Statement

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1 Introduction

1.1 Purpose

This DICOM Conformance Statement (DCS) is written according to part PS 3.2 of [1].

The applications described in this conformance statement are the Siemens implementation of the Basic Cardiac X-Ray Application Profile [2] and the Dynamic Cardio Review Augmented Application Profile [3] within the ACOM product.

1.2 Definitions, Acronyms, and Abbreviations

ACOM	A cardiac review station developed and sold by Siemens Medical Systems in the following configurations: ACOM.M version 2.2 and ACOM.B version 2.2.
ACOM.M	An ACOM that supports FSR (CD disc read), FSC (CD disc create), and FSU (CD disc update).
ACOM.B	An ACOM that supports only FSR (CD disc read).
FSC	File-set Creator
FSR	File-set Reader
FSU	File-set Updater
DICOM	Digital Imaging and Communications in Medicine

1.3 References

[1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-12
[2] Basic Cardiac X-Ray Application Profile, Annex A, NEMA PS 3.11
[3] Dynamic Cardio Review Augmented Application Profile, Version 1.1, July 7, 1995
[4] Dynamic Cardio Review - Extension to the X-Ray Angiographic Image Object and Media Storage, Version 1.1, July 7, 1995

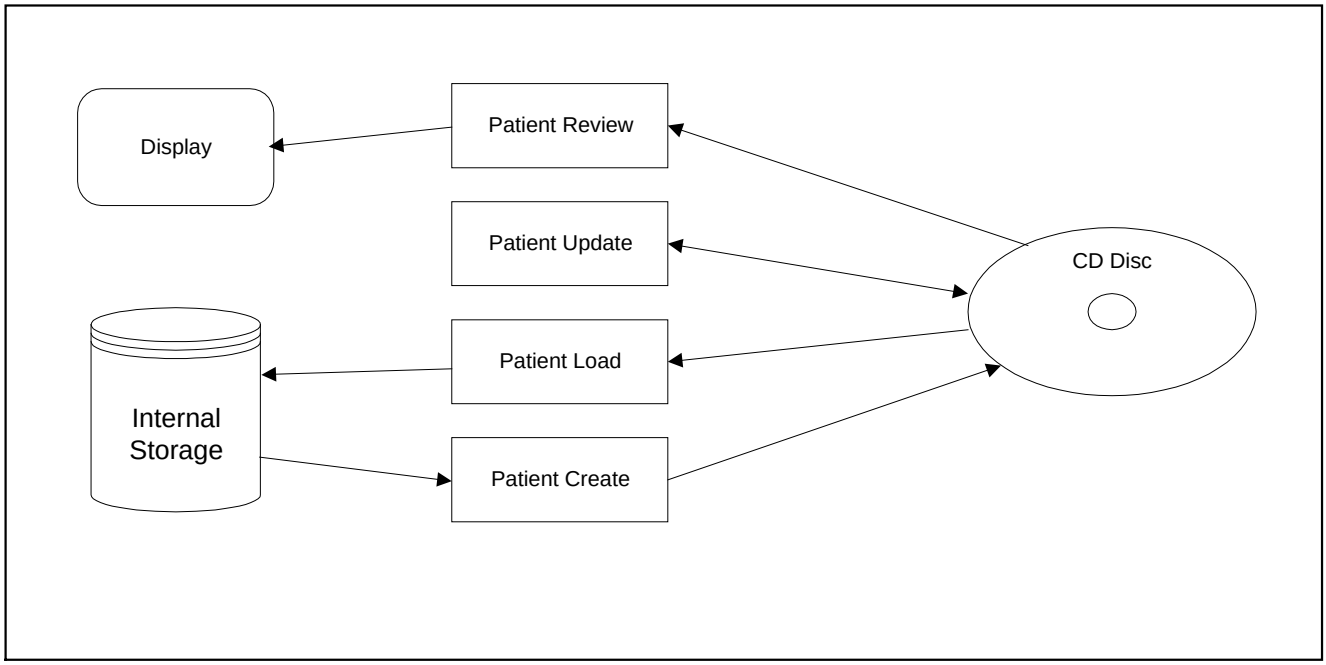
Note: Documents [3] and [4] were developed jointly by Siemens Medical Systems, Inc. and Philips Medical Systems, Nederland B.V.. They are available upon request.

2 Implementation Model

The ACOM provides patient review from CD disc, patient load from CD, creation of a patient on CD disc, and the updating of a patient on CD disc.

2.1 Application Data Flow Diagram

The ACOM.PC provides four Real World Activities: Patient Review, Patient Update, Patient Load, and Patient Create.


Display
Patient Review
Patient Update
Patient Load
Patient Create
Internal Storage
CD Disc

2.2 Functional Definition of Application Entities

The ACOM can perform the following functions:

Patient Review:
Upon inserting a CD disc into the ACOM, a directory is provided that contains all of the images associated with the patient on the disc that conforms to the Basic Cardiac X-Ray Application Profile. Any image within the directory can be selected for direct review from the CD disc.

Patient Update:
During Patient Review from disc, the CD disc can be updated with any changes made to the patient's demographic information.

Patient Load:
Upon inserting a DICOM compliant CD disc in the ACOM, the first patient can be loaded into the internal ACOM storage.

Patient Create:
Upon inserting a blank CD disc into the ACOM, a directory of ACOM patients is provided. Selecting a patient from the directory will create a CD disc containing the patient's demographic and image data.

2.3 Sequencing Requirements

The ACOM requires the following sequencing:

Patient Review:
None.

Patient Update:
The Patient Update must be performed prior to ejecting a CD disc if the demographic information for the CD patient has been modified during Patient Review.

Patient Load:
The Patient Load operation is available after the CD disc containing a patient whose data conforms to the Basic Cardiac X-Ray Application Profile in inserted into the ACOM.

Patient Create:
The Patient Create operation is available after a blank CD disc in inserted into the ACOM.

2.4 File Meta Information Options (see PS 3.10)

Implementation Class UID = "1.3.12.2.1107.5.4.3.2"

3 AE Specifications

3.1 CD Disc Application Specification

The ACOM CD Disc Application provides standard conformance to the DICOM Interchange Option of the Media Storage Service Class. The Application Profiles and roles are listed in Table 3.1-1

Table 3.1-1 Application Profiles, Activities, and Roles for the ACOM CD Disc

Application Profiles Supported	Real World Activity	Role	SC Option
STD-XABC-CD AUG-XABC-DYNAMIC-CD	Patient Review	FSR	Interchange
	Patient Update	FSU	Interchange
	Patient Load	FSR	Interchange
	Patient Create	FSC FSU	Interchange

3.1.1 File Meta Information for the Application Entity

A Source Application Entity Title of "SIEMENS:DCR *n.m*" is used when writing a CD disc as part of a Patient Create or Patient Update operation. The "*n.m*" denote version numbers (Siemens proprietary).

3.1.2 Real-World Activities for this Application Entity

3.1.2.1 Real-World Activity: Patient Review

The ACOM CD Disc Application acts as a FSR using the Interchange option when reviewing a patient's images form the CD disc.

The ACOM CD Disc Application presents only those images on the CD disc that contain 512 x 512 x 8 bit frames formatted to the Basic Cardiac X-Ray Application Profile (SDT-XABC-CD). If the data on the CD disc also conforms to the Dynamic Cardio Review Augmented Application Profile (AUX-XABC-DYNAMIC-CD), then the images can be reviewed directly from the CD disc at or near acquisition rates.

3.1.2.1.1 Application Profiles for Patient Review

Basic Cardiac X-Ray Application Profile (STD-XABC-CD):

If the patient data on the CD disc only conforms to the Basic Cardiac X-Ray Application Profile, then the first pass review rate for each image will be limited to approximately 5 frames/second.

3.1.2.2 Real-World Activity: Patient Update

The ACOM CD Disc Application acts a FSU using the Interchange option when updating a patient's demographic information on the CD disc.

When reviewing patient data from a CD disc originally created by the Patient Create operation, any changes to the patient's demographic information can be updated on the CD disc using the Patient Update operation.

Note: In addition to patient's demographic information, the Patient Update operation also updates other private patient related information. A description of the private information is beyond the scope of this document.

3.1.2.2.1 Application Profiles for Patient Update

Only CD discs created by ACOM's Patient Create operation can be updated by Patient Update. All such CD discs contain both the Basic Cardiac X-Ray Application Profile (STD-XABC-CD) and the Dynamic Cardio Review Augmented Application Profile (AUX-XABC-DYNAMIC-CD).

3.1.2.3 Real-World Activity: Patient Load

The ACOM CD Disc Application acts a FSR using the Interchange option when loading a patient from CD disc.

Any CD disc containing patient demographic and image data conforming to the Basic Cardiac X-Ray Application Profile (STD-XABC-CD) can be loaded into the internal ACOM storage.

3.1.2.3.1 Application Profiles for Patient Load

The ACOM CD Disc Application loads only those images from the patient on the CD disc that contain 512 x 512 x 8 bit frames conforming to the Basic Cardiac X-Ray Application Profile (STD-XABC-CD).

3.1.2.4 Real-World Activity: Patient Create

The ACOM CD Disc Application acts as a FSC using the Interchange option when writing patient data to CD disc.

The ACOM CD Disc Application can write patient data to either a blank or nonblank CD. When appending patient data to a nonblank CD, the ACOM CD Disc Application acts as a FSU when updating the CD's DICOM directory.

3.12.4.1 Application Profiles for Patient Create

Patient Create can write to either a blank disc or non-blank disc. All CD discs created by the Patient Create operation conform to both the Basic Cardiac X-Ray Application Profile (STD-XABC-CD) and the Dynamic Cardio Review Augmented Application Profile (AUX-XABC-DYNAMIC-CD).

4 Augmented and Private Profiles

4.1 Augmented Profiles

As a FSR, the ACOM CD Disc Application can read CD discs that conform to just the Basic Cardiac X-Ray Application Profile (STD-XABC-CD), or to both the Basic Cardiac X-Ray Application Profile (STD-XABC-CD) and the Dynamic Cardio Review Augmented Application Profile (AUX-XABC-DYNAMIC-CD).

As a FSC and a FSU, the ACOM CD Disc Application creates and updates discs that conform to both the Basic Cardiac X-Ray Application Profile (STD-XABC-CD) and the Dynamic Cardio Review Augmented Application Profile (AUX-XABC-DYNAMIC-CD).

4.2 Private Profiles

None

5 Extension, Specializations, Privatizations of SOP Classes and Transfer Syntaxes

ACOM utilizes the SOP class extensions [4] created to support the Dynamic Cardio Review Augmented Application Profile.

6 Configuration

The ACOM product is sold in two configurations, the ACOM.M and the ACOM.B. The ACOM.M supports FSR, FSC, and FSU operations. The ACOM.B supports only FSR operations.

7 Character Sets

The ACOM CD Application Profile supports the use of Latin 1 character set.

All DICOM file sets written to CD discs by the Patient Create and Patient Update operation specify the Latin 1 character set (Specific Character Set = “ISO_IR 100”).

8 Supported Attributes

8.1 DICOM Directory Attributes

Tag	Attribute Name
0002,0000	Group Length
0002,0001	File Meta Information Version
0002,0002	Media Storage SOP Class UID
0002,0003	Media Storage SOP Instance UID
0002,0010	Transfer Syntax UID
0002,0012	Implementation Class UID
0002,0016	Source Application Entity Title
0004,1130	File-set ID
0004,1200	Offset of the First Directory Record of the Root Directory Entity
0004,1202	Offset of the Last Directory Record of the Root Directory Entity
0004,1212	File-set Consistency Flag
0004,1220	Directory Record Sequence
0004,1400	Offset of the Next Directory Record
0004,1410	Record In-use flag
0004,1420	Offset of Referenced Lower-Level Directory Entity
0004,1430	Directory Record Type
0004,1432	Private Record UID
0004,1500	Referenced File ID
0004,1510	Referenced SOP Class UID in File
0004,1511	Referenced SOP Instance UID in File
0004,1512	Referenced Transfer Syntax UID in File
0008,0005	Specific Character Set
0008,0008	Image Type

0008,0020	Study Date
0008,0030	Study Time
0008,0050	Accession Number
0008,0060	Modality
0008,0080	Institution Name
0008,0081	Institution Address
0008,0090	Referring Physician's Name
0008,1030	Study Description
0008,1050	Performing Physician's name
0008,1150	Referenced SOP Class UID
0008,1155	Referenced SOP Instance UID
0008,2112	Source Image Sequence
0010,0010	Patient Name
0010,0020	Patient ID
0010,0030	Patient's Birth Date
0010,0040	Patient's Sex
0018,1063	Frame Time
0018,1500	Positioner Motion
0018,1510	Positioner Primary Angle
0018,1511	Positioner Secondary Angle
0020,000D	Study Instance UID
0020,000E	Series Instance UID
0020,0010	Study ID
0020,0011	Series Number
0020,0013	Image Number
0028,0002	Samples per Pixel
0028,0004	Photometric Interpretation
0028,0008	Number of Frames

0028,0010	Rows
0028,0011	Columns
0028,0100	Bits Allocated
0028,0101	Bits Stored
0028,0102	High Bit
0028,0103	Pixel Representation
0088,0200	Icon Image Sequence
FFFE,E000	Item
FFFE,E00D	Item Delimitation Item
FFFE,E0DD	Sequence Delimitation Item

8.2 Detached Patient Information

Tag	Attribute Name
0002,0000	Group Length
0002,0001	File Meta Information Version
0002,0002	Media Storage SOP Class UID
0002,0003	Media Storage SOP Instance UID
0002,0010	Transfer Syntax UID
0002,0012	Implementation Class UID
0002,0016	Source Application Entity Title
0008,0005	Specific Character Set
0008/0016	SOP Class UID
0008,0018	SOP Instance UID
0008,0020	Study Date
0008,0030	Study Time
0008,0050	Accession Number

0008,0060	Modality
0008,0080	Institution Name
0008,0081	Institution Address
0008,0090	Referring Physician's Name
0008,1030	Study Description
0008,1050	Performing Physician's Name
0010,0010	Patient's Name
0010,0020	Patient ID
0010,0040	Patient's Sex
0020,000D	Study Instance UID
0020,000E	Series Instance UID
0020,0010	Study ID
0020,0011	Series Number

8.3 Lossy Image Data

Tag	Attribute Name
0002,0000	Group Length
0002,0001	File Meta Information Version
0002,0003	Media Storage Class
0002,0010	Transfer Syntax ID
0002,0012	Implementation Class UID
0002,0016	Source Application Entity Title
0008,0005	Specific Character Set
0008,0008	Image Type
0008,0016	SOP Class UID
0008,0018	SOP Instance UID

0008,0020	Study Date
0008,0030	Study Time
0008,0050	Accession Number
0008,0060	Modality
0008,0070	Manufacturer
0008,0080	Institution Name
0008,0081	Institution Address
0008,0090	Referring Physician's Name
0008,1030	Study Description
0008,1050	Performing Physician's Name
0008,1150	Referenced SOP Class UID
0008,1155	Referenced SOP Instance UID
0008,2112	Source Image Sequence
0010,0010	Patient's Name
0010,0020	Patient ID
0010,0030	Patient's Birth Date
0010,0040	Patient's Sex
0018,0060	KVP
0018,1063	Frame Time
0018,1152	Exposure
0018,1155	Radiation Setting
0018,1500	Positioner Motion
0018,1510	Positioner Primary Angle
0018,1511	Positioner Secondary Angle
0020,000D	Study Instance UID
0020,000E	Series Instance UID
0020,0010	Study ID
0020,0011	Series Number

0020,0013	Image Number
0020,0020	Patient Orientation
0020,4000	Image Comment
0028,0002	Samples Per Pixel
0028,0004	Photometric Interpretation
0028,0009	Frame Increment Pointer
0028,0010	Rows
0028,0011	Columns
0028,0100	Bits Allocated
0028,0101	Bits Stored
0028,0102	High Bit
0028,0103	Pixel Representation
0028,1040	Pixel Intensity Relationship
0028,1050	Window Center
0028,1051	Window Width
0028,2110	Lossy Image Compression
0028,6040	R Wave Pointer
5000,0005	Dimensions in Curve D
5000,0010	Points in Curve Data
5000,0020	Type of Curve Data
5000,0030	Axis Units of Curve D
5000,0103	Curve Data Rep
5000,0104	Minimum Coordinate V
5000,0105	Maximum Coordinate V
5000,0106	Curve Range
5000,0110	Axis Specification
5000,0112	Starting Axis Value
5000,0114	Step Axis Value

5000,3000	Curve Data
7FE0,0010	Pixel Data
FFFE,E000	Item
FFFE,E00D	Item Delimitation Item
FFFE,E0DD	Sequence Delimitation Item

8.4 Lossless Image Data

Tag	Attribute Name
0002,0000	Group Length
0002,0001	File Meta Information Version
0002,0003	Media Storage Class
0002,0010	Transfer Syntax ID
0002,0012	Implementation Class UID
0002,0016	Source Application Entity Title
0008,0005	Specific Character Set
0008,0008	Image Type
0008,0016	SOP Class UID
0008,0018	SOP Instance UID
0008,0020	Study Date
0008,0030	Study Time
0008,0050	Accession Number
0008,0060	Modality
0008,0070	Manufacturer
0008,0080	Institution Name
0008,0081	Institution Address
0008,0090	Referring Physician's Name

0008,1030	Study Description
0008,1050	Performing Physician's Name
0010,0010	Patient's Name
0010,0020	Patient ID
0010,0030	Patient's Birth Date
0010,0040	Patient's Sex
0018,0060	KVP
0018,1063	Frame Time
0018,1152	Exposure
0018,1155	Radiation Setting
0018,1500	Positioner Motion
0018,1510	Positioner Primary Angle
0018,1511	Positioner Secondary Angle
0020,000D	Study Instance UID
0020,000E	Series Instance UID
0020,0010	Study ID
0020,0011	Series Number
0020,0013	Image Number
0020,0020	Patient Orientation
0020,4000	Image Comment
0028,0002	Samples Per Pixel
0028,0004	Photometric Interpretation
0028,0009	Frame Increment Pointer
0028,0010	Rows
0028,0011	Columns
0028,0100	Bits Allocated
0028,0101	Bits Stored
0028,0102	High Bit

0028,0103	Pixel Representation
0028,1040	Pixel Intensity Relationship
0028,1050	Window Center
0028,1051	Window Width
0028,2110	Lossy Image Compression
0028,6040	R Wave Pointer
5000,0005	Dimensions in Curve D
5000,0010	Points in Curve Data
5000,0020	Type of Curve Data
5000,0030	Axis Units of Curve D
5000,0103	Curve Data Rep
5000,0104	Minimum Coordinate V
5000,0105	Maximum Coordinate V
5000,0106	Curve Range
5000,0110	Axis Specification
5000,0112	Starting Axis Value
5000,0114	Step Axis Value
5000,3000	Curve Data
7FE0,0010	Pixel Data
FFFE,E000	Item
FFFE,E00D	Item Delimitation Item
FFFE,E0DD	Sequence Delimitation Item